REMARKS

Following this amendment claims 51-75 and 82-98 are pending in the application and are presented for reconsideration and further examination. By the foregoing amendments, claims 51, 63, 83, and 89 have been amended and new claims 97 and 98 have been added. No new matter has been added.

Applicant notes that an Office Action was issued in this application on February 22, 2010. However, without any further communication from the Patent Office, a subsequent Office Action was issued in this application on March 25, 2010. The earlier Office Action was not acknowledged or referenced in the March Office Action. Therefore, it appears that the later Office Action replaces the earlier Office Action. Applicant is responding to the March 25, 2010 Office Action at this time.

Rejections Under § 103

In the outstanding Office Action, claims 51-55, 63-67, 75, 82-89, and 90 were rejected under 35 U.S.C. Section 103(a) as being unpatentable over *Kordsmeyer* (US Patent No. 6963751) in view of *Van Grinsven* (US Patent Publication 20010015985). Applicant respectfully traverses those grounds of rejection.

Embodiments of the claimed systems and methods provide for a connection-oriented MAC layer architecture, in the operation thereof, which enables wireless systems to support QoS (Quality of Service) which had not previously been available before in wireless systems. Examples of QoS parameters include traffic priority, maximum sustained traffic rates, maximum burst rates, minimum tolerable rate, scheduling type, ARQ type, maximum delay, tolerated jitter, service data unit type and size, bandwidth request mechanisms to be used, frame of formation roles, etc.

In one example embodiment, before data transmission occurs, the base station, for the downlink, and subscriber station, for the uplink, organizes data per connections: see Figure 7. "The information intended for each node 16 contains information to be distributed to the end users or services served by the connections of that node; this is identified in Fig. 7 as connection

data 720. The connection data 720 includes the information to be transmitted to the users or services as well as control information the node uses to identify to which of its connections each packet of information should be directed. Thus, the node can ensure that each of the packets of information that it receives is directed to the appropriate connection to reach the intended end user or service." (Page 17, lines 2-9.)

As described, a connection is a uni-directional logical link between two MAC-layer peers (transmitter and receiver). The use of this logical link provides a reference against which a node can request bandwidth. Each connection is identified by a connection identifier (shown for example in Figure 8) which serves as a temporary address for data transmissions over the particular link. "The Connection Identifier field follows the Length field and provides identification information to the base station and the nodes. The Connection Identifier field identifies the destination to which each PDU is to be delivered." (Page 18, lines 2-4.) Each connection associates with one of the services (such as continuous grant, best effort, etc), already present on, or established between the subscriber unit and the base station, a service being characterized, *inter alia,* by a respective level of QoS. Data carried by a connection is scheduled for transmission according to the QoS for that connection. This approach enables the MAC to achieve control. Details on this functionality are provided in the priority document, provisional application 60/262,005. "A connection defines both the mapping between peer convergence processes that utilize the MAC and a Service Flow. The Service Flow defines the QoS parameters for the PDUs that are exchanged on the connection. The concept of a Service Flow on a Connection is central to the operation of the MAC protocol. Service Flows provide a mechanism for upstream and downstream Quality of Service management. In particular, they are integral to the bandwidth allocation process." (Page 25) "The service type is one of continuing grant, continuing grant with activity detection, real-time variable rate, non-real-time variable rate, and best efforts." (Page 27.)

Additionally, in an exemplary embodiment, dynamic bandwidth allocation is provided. That means that the systems and methods according to the invention enable the bandwidth allocation for each subscriber station to change from frame to frame, while the size of the frame itself is fixed. The bandwidth allocated for the subscriber station changes based on demand

received from the various subscriber stations, the bandwidth available in the frame, link conditions, etc., while still taking into account the QoS for all active services. "Numerous queuing techniques and QoS systems may be implemented, but certain embodiments should be flexible and allow the system controls to be adjusted as bandwidth demands change, as connection topography changes and as system demands change based on user requests and feedback. The variety of system configurations available and the ability to change as needed make such embodiments highly useful and largely advantageous over existing systems." Page 21, lines 14-20, of the present application.

To achieve this functionality, in one embodiment the size of the MAC Protocol Data Unit (PDU) is made to be variable, and determined frame-by-frame (see length field in Figures 7 and 14). In tuning the PDU size, the MAC takes into account the bandwidth allocated to the respective connection and all connections that receive bandwidth in the current frame. "Additionally, it is advantageous to coordinate packing and fragmentation with bandwidth allocation so that a communications system can be most flexible and able to capitalize on the circumstances that may exist in any one communications cycle. This system also utilizes a method of packing variable length SDUs that is advantageously adaptive. ", page 29, lines 7-11.

The cited references, alone or in combination, do not teach or suggest such systems and methods.

For example, each of independent claims 51, 63, 83, and 89 claim a system (a node or base station) or method which utilizes a PDU having a variable length and a header with the field which specifies its length. As was acknowledged in the Office Action, *Kordsmeyer* only discloses fixed length PDUs. Each of the independent claims also describes establishing the length for the PDU based on bandwidth allocated to the specified connection in the current frame. Again, *Kordsmeyer* does not teach or suggest a system or method which meets this limitation.

Furthermore, Kordsmeyer is specifically designed for a system such as DECT and does not allow for processing SDUs of various data types as claimed in this application. For example: "To harmonize these two advantages, it is often desirable that a linking or transporting

communications system accepts data in many formats and converts the data into a transporting format for transport across the link. At the far end of the link, the reformatted data may be returned to its original format. In this process of reformatting, incoming data arrives as SDUs (Service Data Units), which may be in any of the above mentioned formats (ATM, IP, voice), and will be converted to PDUs (Protocol Data Units) having a format desirable for a linking communications system." See Page 5, lines 7-14 and claim 53.

Van Grinsven is pointed to in the Office Action as providing teachings to overcome the shortcomings of *Kordsmeyer*. However, *Van Grinsven* does not provide the necessary teachings and cannot properly be combined with *Kordsmeyer*.

Van Grinsven describes mapping of data into frames (physical layer containers). See paragraph 0027 of Van Grinsven: "The transmission system according to FIG. 1 is arranged for transmitting data in ATM format and STM format. It also supports the transmission of variable length packets such as Ethernet packets or TCP/IP packets. Elementary units of the different types of data are packed in so-called Protocol Data Units (PDU's). " That is unlike the cited section of *Kordsmeyer*, which describes SDUs and PDUs at the MAC layer. If one were to attempt to combine *Kordsmeyer* with *Van Grinsven*, that would result in a system that uses fixed length MAC PDUs as in *Kordsmeyer*'s system and which can also transport variable length PDUs in a variable length frame (at the physical layer) as in *Van Grinsven*'s system. The combination of these systems does not describes packing and fragmenting variable length SDUs into variable length MAC PDUs.

Applicant further notes that dependent claims 52 and 64 explicitly add the element of the transmitter which maps the PDUs into frames and transmits the frames from the node (or base station). This further clarifies that *Van Grinsven*, which refers to mapping PDUs into a frame, operation defined in dependent claims 52 and 64, cannot be applied to the independent claims, as the independent claims are not concerned with mapping PDUs in to a frame.

Therefore, the fact that *Van Grinsven* describes a PHY PDU which can have a variable length would not teach or make obvious to one of ordinary skill in the art to modify *Kordsmeyer*

to include a length field specifying the length of the protocol data unit or establish a length of the protocol data unit based on bandwidth allocated to the specified connection in the current frame.

In addition, there is no teaching in *Van Grinsven* to establish the length for the PDU based on bandwidth allocated to the specified connection (the connection whose associated SDUs are being packed and fragmented into the PDU) in the current frame as set forth in the independent claims. That is not surprising because one would not expect processes at the PHY layer to take into account bandwidth allocations for connections.

Still further, modifying *Kordsmeyer* to use variable length PDU's instead of fixed length PDUs would destroy the teaching of this reference. In addition, Kordsmeyer does not need to use such a complex processing since it deals with a limited number of connections/services, all as opposed to the current invention, which addressed the problem of distributing the bandwidth (fixed) between a very large number of connections, while accommodating heterogeneous services, and wherein connections that did not receive bandwidth in one frame may receive it in the next. A description of the services/applications suitable for use with the system claims herein are listed on pages 338 and 340 of the priority document

In view of the foregoing, applicant respectfully requests that the rejections under §103 be withdrawn. Each of the dependent claims is patentable over the references of record at least for the reasons set forth above.

CONCLUSION

The Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims, the reasons therefor, and arguments in support of the patentability of the pending claim set are presented above. In light of the above amendments and remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested. If the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, the

Examiner is respectfully requested to initiate the same with the undersigned.

Respectfully submitted,

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